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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,129	07/16/2003	Yuriy Gmirya	67,008-070;S-5668	1958

74187 7590 11/09/2010

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ART UNIT	PAPER NUMBER
3655	

MAIL DATE	DELIVERY MODE
11/09/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/621,129
Filing Date: July 16, 2003
Appellant(s): GMIRYA, YURIY

David L. Wisz
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 27, 2010 appealing from the Office action mailed March 22, 2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

The present application was previously appealed (appeal no. 2009-002750) and a decision was rendered on November 13, 2009.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1, 3-19, 21-24, and 38-45 are pending and rejected.

Claims 28-37 are withdrawn from consideration.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

4,489,625	WHITE	12-1984
5,813,292	KISH ET AL.	9-1998

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, 12, 16-19, 21-24, 38 and 41-44 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent No. 4,489,625 to White.

Claims 1, 3, 4, 12, 16-19, 21-24, 38 and 41-44:

White (i.e., Figs. 5, 7 and 8; column 4, line 8 - column 12, line 12) discloses a split- torque transmission comprising:

• A main rotor shaft (i.e., Fig. 7, element 101);

• An output gear (i.e., Fig. 7, element 100);

• A first engine (i.e., Fig. 7, element 102);

• A second engine (i.e., Fig. 7, element 103);

• An input shaft (i.e., Fig. 7, element 106) driven by one of the first and second engines;

• A face gear (i.e., Fig. 7, element 115) driven by the input shaft about a face gear axis of rotation (see Fig. 7);

• A first spur gear (i.e., Fig. 7, element 117, and column 5, lines 15-18) mounted for rotation about a first spur gear axis of rotation (see Fig. 8);

• A first drive gear (i.e., Fig. 7, element 108) driven by the first spur gear;

• A second spur gear (i.e., Fig. 7, element 117, and column 5, lines 15-18) mounted for rotation about a second spur gear axis of rotation (see Fig. 8);

• A second drive gear (i.e., Fig. 7, element 108) driven by the second spur gear;

• A floating pinion gear (i.e., Fig. 7, element 116) driven by a radially unsupported pinion shaft mounted to the face gear, the floating pinion gear meshed with the first spur gear and the second

spur gear, and the floating pinion gear mounted for rotation about a floating pinion axis of rotation which provides a resilient characteristic (i.e., Fig. 7; column 11, lines 26-43);

• Wherein the floating pinion gear is meshed with the first spur gear and the second spur gear (i.e., Fig. 7);

• Wherein the floating pinion axis of rotation, the first spur gear axis of rotation, and the second spur gear axis of rotation are located along a common line (i.e., column 11, lines 26-32);

• Wherein the floating pinion axis of rotation is displaceable off said common line to split a load between the first spur gear and the second spur gear (i.e., column 11, lines 32-37);

• Wherein the radially unsupported pinion shaft is driven through a gear mesh (i.e., Fig. 7, being the meshing of the spiral bevel gear teeth arrangement of gear elements 114 and 115) generally transverse to the floating pinion axis of rotation (i.e., Fig. 7);

•Wherein the floating pinion gear is mounted to the radially unsupported pinion shaft in a cantilever manner (i.e., Fig. 7 or Fig. 5);

• Wherein the floating pinion gear is mounted to a distal end of the radially unsupported pinion shaft (i.e., Fig. 7 or Fig. 5);

• Wherein a displacement envelope within which the floating pinion gear axis of rotation may be displaced is non-linear (i.e., column 11, lines 26-37);

• Wherein the displacement envelope within which the floating pinion gear axis of rotation may be displaced is inherently transverse to the floating pinion gear axis of rotation;

• Wherein the displacement envelope, within which the floating pinion gear axis of rotation may be displaced to split the load between the first spur gear and the second spur gear, generally includes diamond shape;

• Wherein the floating pinion axis of rotation, the first spur gear axis of rotation, and the second spur gear axis of rotation are generally parallel (i.e. Fig. 7 and column 11, lines 26-37);

• Wherein the floating pinion axis of rotation, the first spur gear axis of rotation, and the second spur gear axis of rotation are generally parallel to a main rotor axis of rotation defined by the main rotor shaft (i.e. Fig. 7 and column 11, lines 26-37);

•Wherein a first spur gear periphery of the first spur gear and a second spur gear periphery of the second spur gear at least partially overlaps an output gear periphery of the output gear adjacent a first side of the output gear, and a face gear periphery of the face gear at least partially overlaps the output gear periphery adjacent a second side of the output gear (i.e., Figs. 7 and 8).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5-11, 13-15, 39, 40 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of U. S. Patent No. 5,813,292 to Kish et al.

Claims 5-11, 13-15, 39, 40 and 45:

White discloses the limitations as set forth in paragraph 7 above. Regarding claims 5-11, 13-15,

39, 40 and 45, White lacks:

• A first double helical gear driven by the first spur gear;

• A second double helical gear driven by the second spur gear; and

• Wherein the first double helical gear is of a smaller diameter than the first spur gear and the second double helical gear is of a smaller diameter than the second spur gear.

Kish (i.e., Figs. 1-2 and 6; column 1, line 50 - column 13, line 62), on the other hand, teaches a split path transmission system comprising:

•A first double helical gear (i.e., Fig. 1, element 118L Fwd or 118R Fwd) driven by the first spur gear;

• A second double helical gear (i.e., Fig. 1, element 118L Fwd or 118R Fwd) driven by the second spur gear; and

•Wherein the first double helical gear is of a smaller diameter than the first spur gear and the second double helical gear is of a smaller diameter than the second spur gear (i.e., Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify White such that the first and second drive gears are double helical gears and the diameter of the first and second double helical gears are smaller than the first and second spur gears, in view of Kish, in order to provide an effective equal torque splitting transmission.

(10) Response to Argument

Appellant argues the following points:

A) The Examiner has not identified a "radially unsupported pinion shaft" (claims 1 and 12).

B) The Examiner has not identified a face gear mounted to said pinion shaft (claim 3).

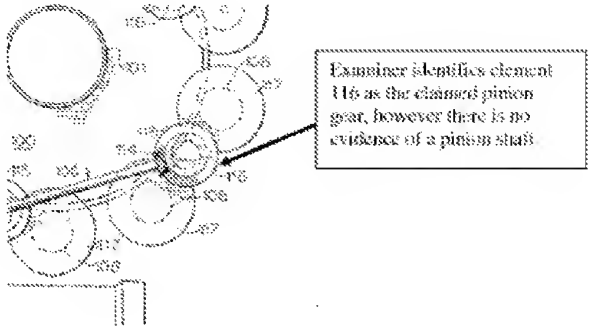
C) White cannot define a displacement envelope of a particular defined shape, let alone a displacement envelope that is diamond shaped (claim 24).

D) White has no need for a double helical gear, and the modification would serve no purpose (claim 8).

Argument A

With regard to the first argument, appellant argues that the Examiner does not identify a pinion shaft in the rejection. It can be shown that a corresponding identification number for the pinion shaft is not provided. Therefore, only a figure (i.e. Fig. 7) and general location of the shaft (i.e. element 116) was provided in the rejection.

Given Fig. 7 is only an overhead view of one of the embodiments, appellant argues that there is no evidence of a pinion shaft:



Appellant uses Fig. 3 as evidence to confirm that there is likely no pinion shaft:

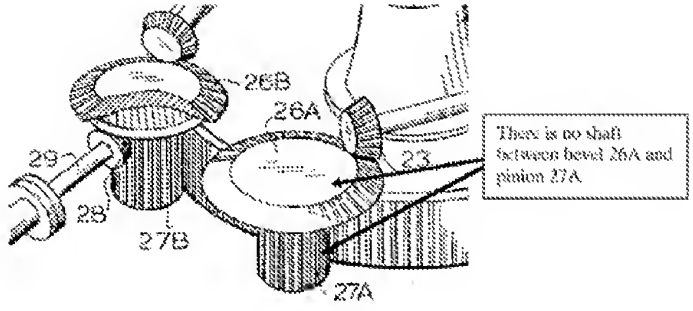


Fig. 3, White

It can be shown, however, that applicant has used the incorrect figure as an example of an analogous gear/pinion shaft arrangement.

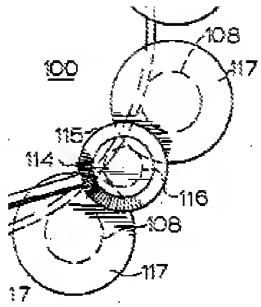


Fig. 7, White

As disclosed in the specification of White (Col. 10), gear 100 is a combining gear which meshes with final drive pinions 108. Gear 115 is a reduction bevel gear which has a drive pinion 116 fixedly secured thereto. Drive pinion 116 meshes with reduction gears 117, which are fixedly secured to final drive pinions 108. A figure that is representative of an analogous gear/pinion shaft arrangement is Fig. 5.

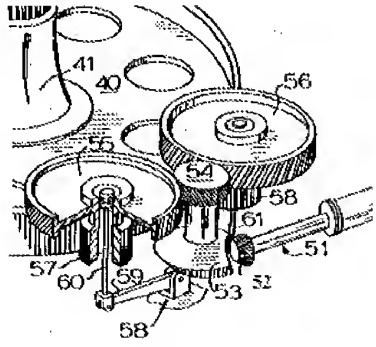


Fig. 5, White

In Fig. 5 of White, a side profile of the isometric is shown. As disclosed in the specification of White (Col. 7), gear 40 (analogous to part 100) is a combining gear which meshes with final drive pinions 57 and 58 (analogous to parts 108). Pinion 54 (analogous to part

116) meshes with reduction gears 55/56 (analogous to parts 117), which are fixedly secured to drive pinions 57/58 (analogous to parts 108).

In Col. 7, White states that "the reduction bevel gear 53 is disposed for rotation about a vertical axis and has helical pinion 54 fixedly secured thereto." Although White does not expressly disclose in the specification that the pinion 54 is secured to the reduction gear 53 by a pinion shaft, it can be shown that there is in fact a shaft connecting the two parts in Fig. 5.

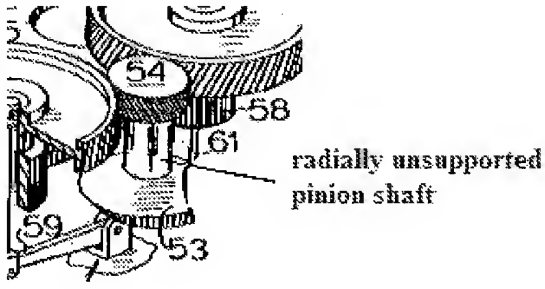


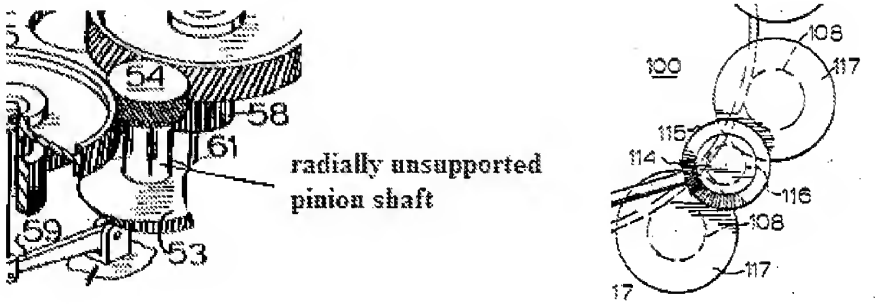
Fig. 5, White (annotated)

Given the same "fixedly secured thereto" description in the specification (with regard to the connection between the reduction gears (53/115) and drive pinions (54/116)), and Fig. 5 showing the radially unsupported pinion shaft connection, one would come to the conclusion that White teaches said radially unsupported pinion shaft connecting pinion 116 and reduction bevel gear 115.

Argument B

With regard to the second argument, appellant extends the first argument, stating that White does not teach of a face gear mounted to said pinion shaft, because White does not disclose a pinion shaft.

As discussed above, White does teach of a pinion shaft connected to the floating pinion gear 116, and said shaft is connected to face gear 115 (aka reduction gear).



Argument C

With regard to the third argument, appellant argues that White cannot define a displacement envelope of a particular defined shape, let alone a displacement envelope that is diamond shaped.

Appellant has disclosed the movements of the floating pinion in Figs. 3 and 4 (of the present invention).

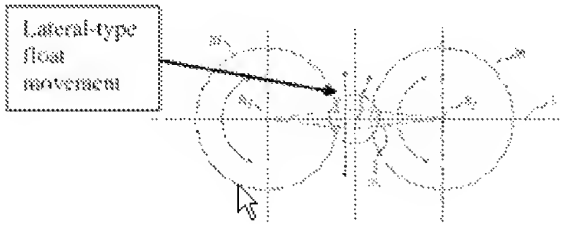


FIG. 4

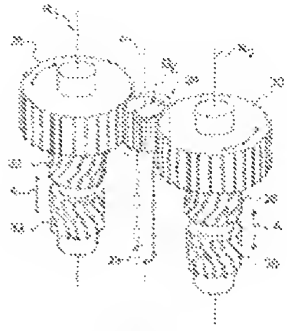


FIG. 3

In claim 24, applicant claims that the displacement envelope within which said floating pinion gear axis of rotation may be displaced through flexing of said radially unsupported pinion shaft is "generally diamond shaped."

White teaches that drive pinion 116 is radially unsupported and allowed to float freely between the two driven gears 117. This is disclosed in Col. 11 and the interpretation has been affirmed by the Board on November 12, 2009.

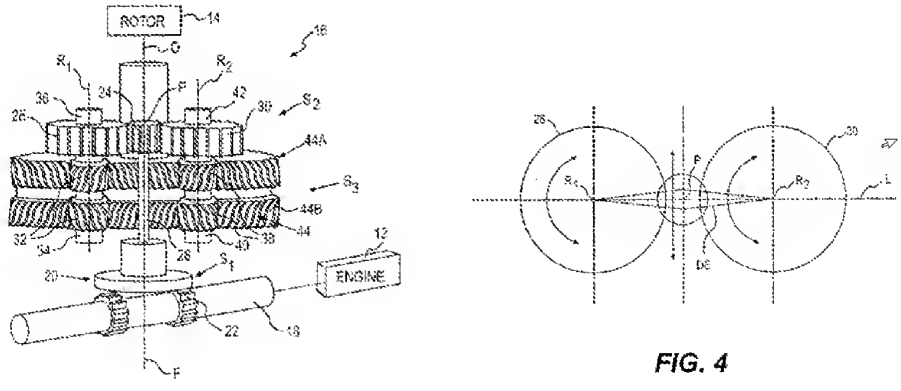


FIG. 4

In the present invention, drive pinion 24 is radially unsupported and fixed to face gear 20 through the pinion shaft. Pinion 24 meshes with spur gears 28/30.

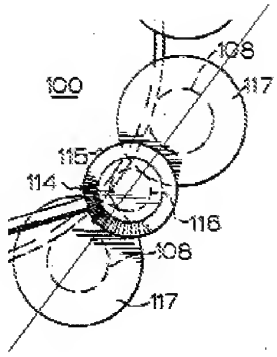


Fig. 7, White (with centerline drawn)

White teaches that the drive pinion 116 is radially unsupported and fixed to face gear 115 through the pinion shaft. Pinion 116 meshes with gears 117. Given the same meshing relationships, parts and support (or lack thereof), floating pinion gear 116 of White is free to float and move (Col. 11) between gears 117. Any movement will produce a displacement envelope of some shape and that shape would read upon a "generally diamond shape."

Argument D

With regard to the fourth argument, appellant argues that White has no need for a double helical gear, and the modification would serve no purpose.

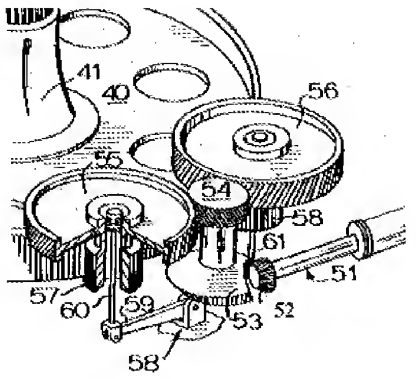


Fig. 5, White

Using Fig. 5 of White, since it provides the most detailed view of an analogous transmission, it is true that White only teaches of reduction gears 55/56 being fixedly attached to only singe drive pinions 57/58, which in turn mesh with a single combining gear 40. It can be shown, however, that there is a better alternative.

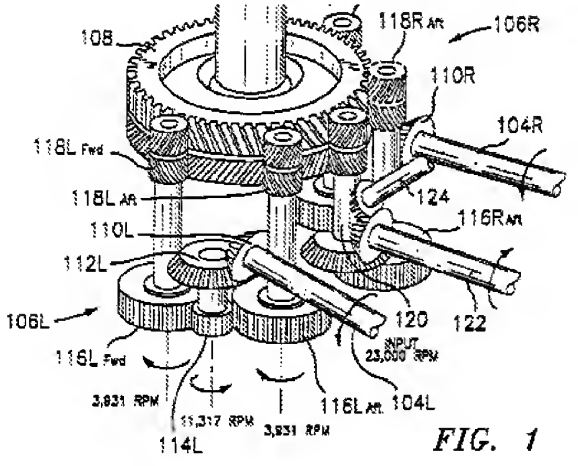


FIG. 1

Kish teaches a similar transmission wherein reduction gears 116L are fixedly attached to double helical gears 118L, which in turn mesh with two combining gears 108. The purpose of this arrangement is to attain effective equal torque splitting (Col. 5), as stated in the motivation for the combination. Given the teachings of Kish, White would be modified to have double

helical gears meshing with double combining gears. This reduces the load on each reduction (helical) gear and combining gear, thereby reducing wear and improving the durability of the transmission. The modification would have been obvious because using double gears is a known technique used to improve other transmissions in the same manner.

Applicant's arguments have been considered, but are not persuasive.

(11) Related Proceeding(s) Appendix

Copies of the court or Board decision(s) identified in the Related Appeals and Interferences section of this examiner's answer are provided herein.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Roger L Pang/

Primary Examiner, Art Unit 3655

Conferees:

/David D. Le/

Supervisory Patent Examiner, Art Unit 3655

/MJ/ Marc Jimenez

TQAS TC 3600